ACTIVITY

#1:

- Take a penny. - Flip the penny 40 times. - Record the number of heads and tails in the chart below.

HEADS	TAILS
𝍸 𝍸 𝍸 𝍸	𝍸 𝍸 𝍸 𝍸
𝍸 𝍸 𝍸	𝍸 𝍸 𝍸 1111
1	

heads

- Calculate a 95% confidence interval for p (the proportion of tails flipped)

$\hat{p} = \frac{21}{40}$ (0.37025, 0.67975)

- Perform a test to see if your coin is fair
  - *Hint: your coin is claimed to be fair. Thus, the proportion of tails is supposed to be? TEST THIS*

$H_0: p = 0.5$ $Z = 0.316$

$H_a: p \neq 0.5$ p-val = 0.752

Fail to reject → p = 0.5 → coin is fair

ACTIVITY

#1:

- Take a quarter. - Flip the penny 40 times. - Record the number of heads and tails in the chart below.

HEADS	TAILS
19	21

- Calculate a 95% confidence interval for p (the proportion of ~~tails~~ heads flipped)

$\hat{p} = \frac{21}{40} = (0.37025, 0.67975)$

- Perform a test to see if your coin is fair
  - *Hint: your coin is claimed to be fair. Thus, the proportion of tails is supposed to be? TEST THIS*

$H_0: p = 0.5$

$H_a: p \neq 0.5$

$z = 0.3162$

$p\text{-val} = 0.752$

* fail to reject $\rightarrow p = 0.5$

Comparing Two ~~Means~~ Prop.

- We want to compare... 2 populations use 2 samples
- Each group is considered... a distinct sample from its pop.
- Responses in each group are... independent

2 Proportion Z Confidence Interval

We are comparing... 2 proportions

If the 2 proportions are the same, then... $p_1 = p_2$ and $p_1 - p_2 = 0$

So we are looking at... difference btw. the 2 proportions

$\frac{16}{40}$ $\frac{16}{40}$

Interval Formula:

GENERIC:

statistic ± (critical value)(std. dev. of statistic)

FOR 2 PROPORTIONS SPECIFICALLY:

$$(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$\hat{p}_1$: p, $\hat{p}_2$: q

Parameters: p_1 and p_2 $\quad p_1 - p_2$

Statistics: $\hat{p}_1$ and $\hat{p}_2$ $\quad \hat{p}_1 - \hat{p}_2$

Standard Error = ⟶ std. error = std. dev. of stat

INTERPRETATION:

We are ___ % conf. that the difference btw. the prop. of ___pop. 1___ and ___pop 2.___ is btw. ___a___ and ___b___.

$\hat{p}_1 = \frac{21}{40}$ $\hat{p}_2 = \frac{21}{40}$ $(-0.2189, 0.2189)$

1 $\frac{19}{40}$ 2 $\frac{22}{40}$

2 Proportion Z Test

Same steps for the test of significance:

1. Assumptions
2. Hypotheses
3. Test Statistic
4. p-value
5. Conclusion

2 populations with each of their statistics and parameters... (denoted with numbers)

	Pop. 1	Pop. 2
population prop.	p_1	p_2
[redacted]		
sample size	n_1	n_2
sample Prop.	$\hat{p}_1$	$\hat{p}_2$
[redacted]		

Hypotheses:

- We are comparing... 2 population proportions

Ho: $p_1 = p_2$

Ha: $p_1 \neq p_2$

OR

$H_0: p_1 - p_2 = 0$

$H_a: p_1 - p_2 \neq 0$

* no #'s

Test Statistic:

GENERIC FORMULA:

FOR 2 PROPORTIONS SPECIFICALLY:

$Z =$ _____ $p =$ _____ =

Standard Error =

Notice how this is…

Why? What is this called?

What is pooled?

Why do we do this test pooled?

P-Value:
Same as...

Conclusion:
Same as...

Assumptions

-
-
-

Example:

We are looking at the binge-drinking example again, except this time we are splitting the results by gender. We want to see if men and women are as likely to be binge drinkers. Use the results below to perform a full test of significance.

	n	x	$\hat{p}$
Men	7180	1630	
Women	9916	1684	
Total	17096	3314	

Find and interpret a 92% confidence interval for the difference in the proportion of college binge drinkers between men and women.

Example #2:
Go back to your activity. Test to see if you quarter and penny have the same proportion of tails.

CALCULATOR:

Confidence Interval:

Hypothesis Test: